STATISTICAL APPLICATIONS IN THE PERFORMANCE OF CONTRACT PROPERTY MANAGEMENT AUDITS

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FIRST THOUGHTS

- **I am NOT going to bore you with formulas of algebraic equations.**
- **I want to talk to you about "REAL WORLD APPLICATION" with the hope that you will <u>THINK</u>, <u>DEEPLY THINK</u> about populations, statistics and evaluation of a sample when performing your Property Management System Audit.**

OVERVIEW

The knowledge and comprehension of

STATISTICS

is CRITICAL to the proper

APPLICATION OF AUDIT PROTOCOLS

within the

PROPERTY MANAGEMENT PROFESSION!

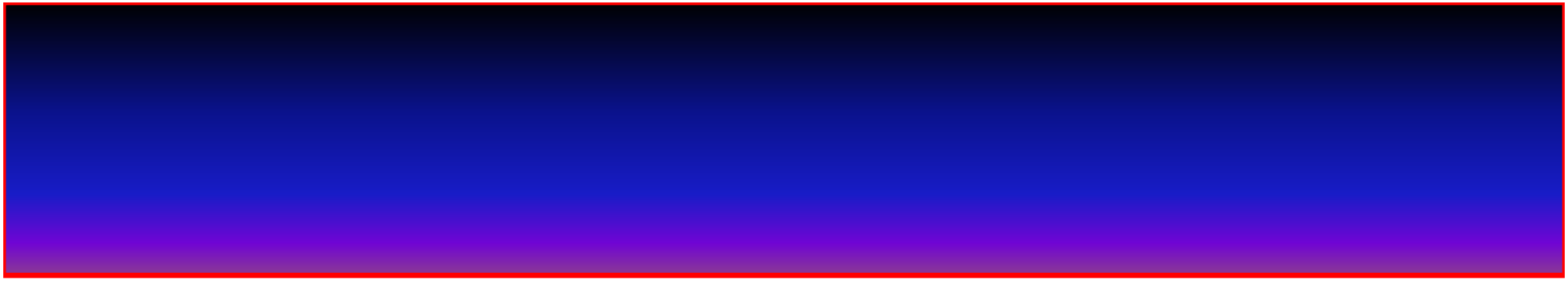
(And even in your daily lives)

http://www.wired.com/magazine/2010/04/st_thompson_statistics/

Great little article for you to read!

Three Major Concerns

- **POPULATION(S)**
  - **Proper Definition and Selection**
- **SAMPLING**
  - **Methods**
  - **Confidence Level**
- **EVALUATION OF A SAMPLE**
  - **Quantitative/Qualitative**
  - **Concerns with Materiality/Significance**



So, Let’s have at it!

POPULATIONS

- The PROPER definition of a **POPULATION** is CRITICAL as a foundation to performing an audit on a PROCESS or PROCESS SEGMENT!
- If done improperly:
  - Your results may **NOT** be GENERALIZABLE and
  - Your results may be (Probably are) **SPECIOUS**!
    - This is called **POPULATION SPECIFICATION ERROR —** This type of error occurs when the researcher selects an inappropriate population or universe from which to obtain data.

POPULATION

- **Definition:**
  - **POPULATION: Formally, a population is any collection of objects or individuals that have at least one characteristic in common. In INFERENTIAL statistics one usually wishes to determine the value of some characteristic of a population…. Populations are the objects of generalization in inferential statistics.**
    - **Statistics – A Spectator Sport, R.M. Jaegar, Sage Publications, 1983**

POPULATION

- **Definition:**
  - **POPULATION means an entire set of data from which a sample is selected and about which the auditor wishes to draw conclusions. A population may be divided into strata, or subpopulations, with each stratum being examined separately.**
    - **Internal Auditing Practices Committee, 1997**

POPULATION

- A **statistical population** is a set of entities concerning which statistical inferences are to be drawn, often based on a **random sample** taken from the **population**.
  - Wikipedia, http://en.wikipedia.org/wiki/Statistical_population

POPULATION DEFINITION WITHIN CONTEXT OF PMSA

- **POPULATIONS ARE "DRIVEN" BY:**
  - **The PROCESS or PROCESS SEGMENT**
    - **As called out in the Government Property Clause,**
      - **FAR 52.245-1(f)**
  - **Whether the PROCESS is driven by:**
    - **Transactions**
      - **Where a Timeframe is a variable**
    - **Attributes**
      - **Where one cannot apply a timeframe**

ADDITIONAL CONCERNS IN POPULATION SELECTION

- **Whether the Population is of a:**
  - **–TRANSACTIONAL NATURE or a**
  - **–NON-TRANSACTIONAL OR ATTRIBUTE NATURE?**
    - **Huh? What? What the heck does that mean? I'm glad you asked!**

      »See the next slide!

Population Selection

- **Transactional Items**
  - **Selecting a population based upon**

    Actions that have occurred during a set period of time, e.g.,
    - **purchase made during a set timeframe,**
    - **receipts of property during a set time frame,**
    - **etc.**
- **ATTENTION! The timeframe for selecting a transaction based population is One year or back to the last analysis, Whichever is Less!**
  - **Addresses the issue of SEASONALITY!**

POPULATION SELECTION

- **Non-Transactional Items**
  - **Selecting a population based upon:**

Attributes

- **e.g.,**
  - **all locations where property is stored**
  - **estimated quantities of property**
  - **estimated number of records for a specific type of property, etc.**
  - **ATTENTION: Generally, NOT driven by Timeframe but MAY include a timeframe as a SUBSET for defining your population….**

TRANSACTIONAL versus NON-TRANSACTIONAL

TWO EXAMPLES USING A GUMBALL MACHINE!

DEFINE for me two (2) different Populations:

1. A TRANSACTIONAL POPULATION

and

2. A NON-TRANSACTIONAL POPULATION

TRANSACTIONAL versus NON-TRANSACTIONAL

- **Gumball Machine and a TRANSACTIONAL POPULATION**
  - **Quantity of Gumballs ISSUED FROM Machine over a set period of Time. (An Action or ACTIVITY)**
  - **Quantity of Gumballs PLACED INTO the Machine over a set period of Time. (An Action or ACTIVITY)**
- **Gumball Machine and a NON-TRANSACTIONAL POPULATION (ATTRIBUTES)**
  - **ACTUAL COUNT of the Gumballs currently in the Machine (Static, no action involved)**

POPULATION DEFINITION WITHIN CONTEXT OF PMSA

- **So, what are you looking for?**
  - **Maximum # of items possible within Process or Process segment.**
    - **Predicated upon their basis being either:**
      - **Transactional or**
      - **Non-Transaction (Attributes)**
  - **With Common Characteristics**

POPULATION DEFINITION WITHIN CONTEXT OF PMSA

- **For certain items You May ESTIMATE population, e.g.**
  - **Rough order of Magnitude of ALL GP in contractor's possession**
  - **Rule Count of records cards (Manual system)**
- **For Others,"ACTUALS" are readily available, e.g.,**
  - **Last Physical Inventory Count Sheets**
  - **Sequentially Numbered Computer Listings**
- **Based upon Transactional/Non-transactional Nature of Function**
  - **But, REMEMBER!!! THEY MUST HAVE**

Common Characteristics

POPULATION DEFINITION WITHIN CONTEXT OF PMSA

- **O.k., here is where it gets tougher!**
  - **How many PROCESSES are called out in FAR 52.245-1?**
    - **_____**
  - **How many processes are there for POPULATION DEFINITION within a PMSA?**
    - **_____**
    - **CORRECT Technical Answer – IT DEPENDS!**
    - **Remember, I want you to think DEEPLY about the design of your PMSAs. So, It depends upon the Processes subject to review in your PMSA, and the complexity of your contractor's PMS!**

Under the Aug 2010 FAR GP CLAUSE WHAT are the processes?

- **Acquisition**
- **Receipt**
- **Records**
- **Physical Inventory**
- **Subcontractor Control**
- **Reports**
- **Relief of Stewardship Responsibility**
- **Utilizing**
- **Maintenance**
- **Property Closeout**

10 Processes specifically called out

EXPANDED FAR PROCESSES

- Acquisition
- **Receipt**
  - **Identification**
- Records
- Physical Inventory
- Subcontractor Control
- Reports
- Relief of Stewardship Responsibility
- **Utilizing**
  - **Use**
  - **Consume**
  - **Storage**
  - **Move**
- Maintenance
- Property Closeout

Ahhh, so there are **processes** or **SUB-processes** EMBEDDED in the PROCESSES….

And in the immortal words of Billy Mays
"But wait – there's more!"

Now we have 14 Processes

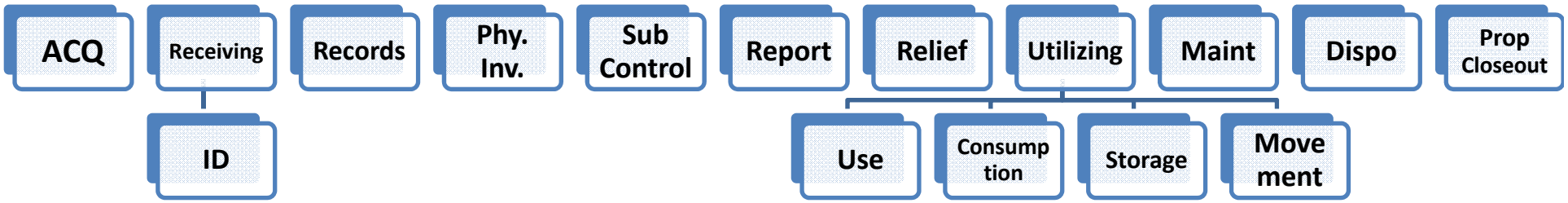
In REALITY – from an AUDIT perspective – there are 15 SEPARATE and DISTINCT PROCESSES!!!

- **WHY?**
- **Because of the SECOND and THIRD STEPS in the AUDIT PROCESS:**
  - **Define the Attributes and Transactions**
  - **Define the Population and/or Sampling Unit**

  - **Let me explain! – That means see the next slide!**

Note: There are really MORE than 15 separate and distinct process But I can't cover them all in the time allotted!

The Processes



- **REMEMBER: It is CRITICAL to properly DEFINE these PROCESS POPULATIONS and to CAREFULLY DEFINE the CRITERIA subject to AUDIT**
  - **And Again… an improperly defined POPULATION will lead to SPECIOUS results/findings/determinations!**

POPULATION DEFINITION WITHIN CONTEXT OF PMSA

- **For each PROCESS POPULATION you must COMPREHEND and determine:**
  - **The SOURCE of your Population. These may be:**
    - **DOCUMENTS driving ACTIONS**
    - **TYPES/CLASSES of Property framing a population**
    - **LOCATIONS, e.g., where property is stored**
  - **The SUPPORTING Documents**
    - **Not the Source Documents, but the documents that you will use to verify postings… (more on this later)**
- **In too many situations I have seen lots of confusion about the SOURCE DOCUMENTS versus supporting documents that make up your population.**

PROCESS POPULATIONS

- **ACQUISITION**
  - **SOURCE DOCUMENTS:**
    - **PURCHASE ORDERS**
    - **PETTY CASH VOUCHERS**
    - **CREDIT CARD RECEIPTS**
  - **SUPPORTING DOCUMENTS**
    - **Purchase Requisitions**
    - **Engineering Drawings**
    - **Blueprints**
    - **Material Requirement Lists**
    - **Etc.**

These documents **ACCOMPLISH** the ACT/ACTION you are testing, i.e., the ACQUISITION of "STUFF."

These documents **PROVIDE SUPPORTING EVIDENCE** that the ACT/ACTION was valid and/or Necessary in the ACQUISITION of "STUFF."

PROCESS POPULATIONS

- **RECEIVING**
  - **SOURCE DOCUMENTS**
    - **RECEIVING REPORTS**
    - **DISCREPANCY REPORTS**
  - **SUPPORTING DOCUMENTS**
    - **Purchase Orders**
    - **Shipping Documents**
      - **Bills of Lading**
      - **Packing Slips**

ACCOMPLISH the ACT/ACTION

PROVIDE SUPPORTING EVIDENCE to the ACT/ACTION

PROCESS POPULATIONS

- **IDENTIFICATION**
  - **TWO WAYS TO TEST**
    - **As Part of the Receiving Process (Using the Population for Receiving)**
      - **WEAKNESSES:**
        - » **No review of Identification methods for items in the contractors possession for years.**
        - » **Not every item coming in through receiving requires the application of a physical identification placed on the item.**
    - **As a separate Population of all items that are required to have Physical Identification placed on the item.**

PROCESS POPULATIONS

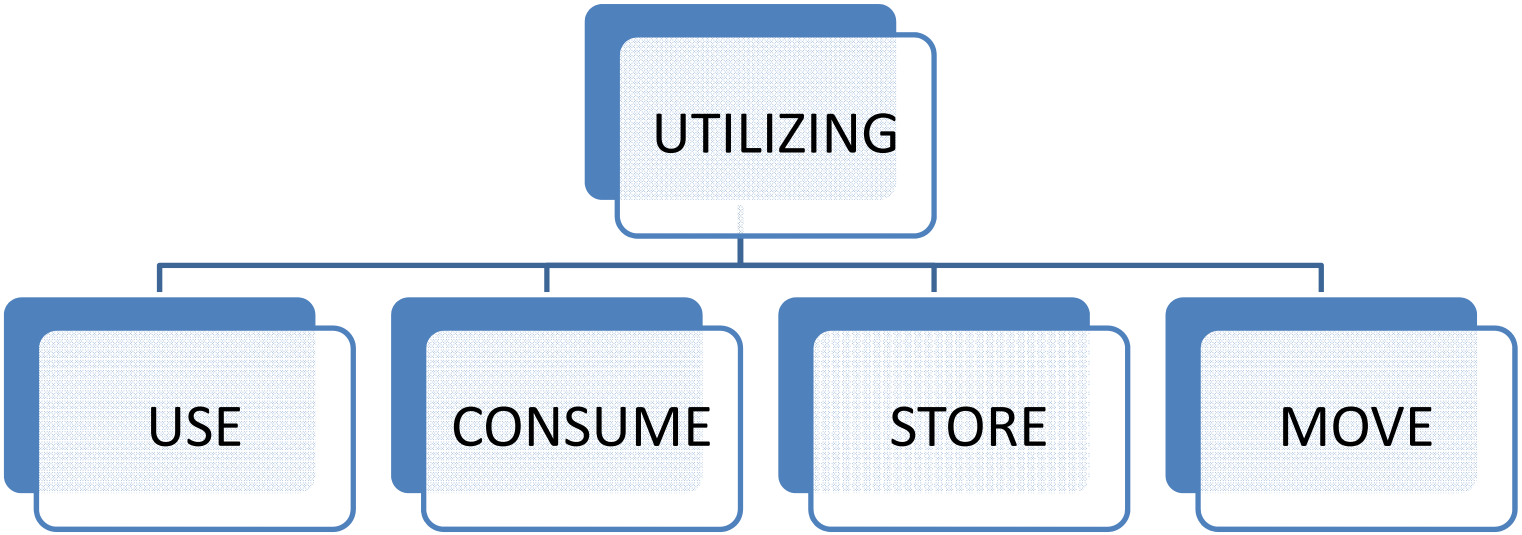
- **RECORDS**
  - **<u>SOURCE</u> DOCUMENTS**
    - **INDIVIDUAL ITEM RECORD FOR EACH ITEM OF GP**
      - **MAT, ST, STE, EQUIPMENT and RP**
        - » **For Material the old term was a Perpetual Inventory Record**
  - **<u>SUPPORTING</u> DOCUMENTS**
    - **Receiving Reports**
    - **Issue Slips**
    - **Physical Inventory Count Sheets**
    - **Disposal Documents**
      - **All of these can be considered a "POSTING REFERENCE" as required by FAR 52.245-1(f)(1)(iii)**

Note: The above DOES NOT include MATERIAL RECORDS under an APPROVED Receipt and Issue System.

PROCESS POPULATIONS

- **O.k., we don't have time to review EVERY PROCESS POPULATION**
- **Rather, we have given you some ideas the think about in regard to defining or "framing" your populations.**
- **I would like to look at one more Process which I have seen some problems in application.**
    - **FAR 52.245-1(f)(1)(viii)Utilizing GP**

DEFINE THESE POPULATIONS

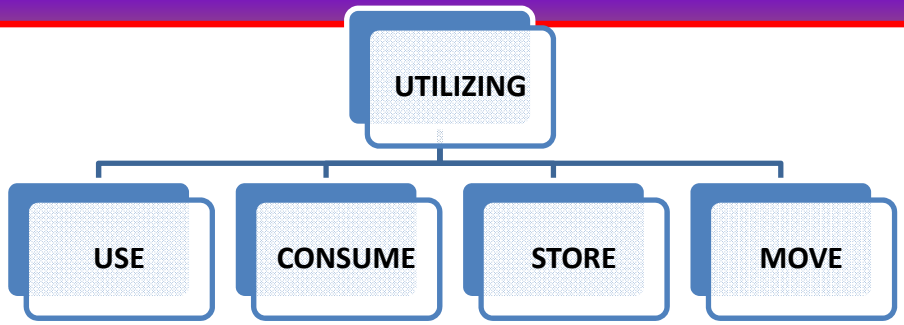


Can I use ONE population to test all four SUB-PROCESSES?

Should I use FOUR populations to test all four SUB-PROCESSES?

CAREFUL – it may be as intuitive as you think!

THE POPULATIONS



Use – All Government Owned **Equipment, ST, and STE** accountable to active contract(s) or contracts closed back one year or to the last audit.
Source Documents: **Records/Inventory Records.**

Consume – All Government Owned **Material** accountable to active contract(s) or contracts closed back one year or to the last audit.
Source Documents: **Records/Perpetual Inventory Records.**

Store – All locations where **ALL CLASSES OF Government Property** are currently **stored**.
Source: **Storage Locations.**

Move – All Government Property **moved** (Internally or externally) back one year or to the last audit.
Source Document: **Move tickets.**

PROCESS POPULATIONS

- So, from a "AUDIT PURIST" standpoint – you **CANNOT** use one population to test the four processes subsumed under **UTILIZING GP**.
- These must be tested as **FOUR SEPARATE and DISTINCT POPULATIONS and TESTS** **BECAUSE** the items making up their POPULATIONS are dissimilar, i.e., they have different source document, some are not even documents but locations…
- There are **NO COMMON CHARACTERISTICS**!

TRANSITION FROM POPULATIONS TO SAMPLING

GREAT!

So we understand that defining/fencing or framing a population is critical to the validity of your AUDIT FINDINGS and RESULTS!

So what about sampling?

SAMPLING

- **GENERALLY ACCEPTED AUDITING STANDARDS**
  - **GAAS**
    - **"Examining the documentation of every single transaction that occurs in a business is very costly and time consuming. Since most audit objectives do not require the amount of evidence that results from examining every transaction, an auditor will frequently use sampling techniques and procedures.**
    - **The purpose of sampling is to examine less than 100% of the items in a given population… an auditor can draw a conclusion about certain characteristics of the total population."**
      - **Section 10.03-10.04**

WHY USE SAMPLING?

- **Why use Sampling?**
  - **"Time and cost are probably the two most important reasons for sampling….**
  - **Testing may prove destructive.**
    - **You certainly do not want to test every bomb built by a contractor. ☺ (That was meant to be humorous!)**
  - **Accuracy is another reason for sampling. At first glance this seems incongruous. One would think that a study of the entire population would be more accurate than a study of a sample…. Thus, studying a well-defined sample, may provide more accurate results than a sloppy survey of the entire population."**
    - **Pg. 96. Introduction to Statistics for Executives, Sobol and Starr, McGraw Hill, NY.**

TYPES OF SAMPLING

- **The Old DoD Property Manual assigned "classes" to its criteria requiring/allowing use of different sampling methods:**
  - **Class I**
    - **Requires statistical sampling of population.**
  - **Class II**
    - **Allowed judgmental or statistical sampling of population.**
  - **Class III**
    - **Allows purposeful sampling of reported deficiencies.**
- **Technically, these three types of sampling techniques are still valid!**

TYPES OF SAMPLING

- **Statistical versus Nonstatistical Sampling**
  - **It is acceptable for auditors to use either statistical or nonstatisitical sampling methods.**
  - **Statistical sampling is the use of mathematical measurement techniques to calculate formal statistical results. The primary benefit of statistical methods is the quantification of sampling risk. [What we call our confidence level.]**
  - **In nonstatistical sampling the auditor does not quantify sampling risk. Instead conclusions are reached about populations based on a more judgmental basis."**
    - **Auditing – An Integrated Approach, Arens and Loebbecke, Prentice Hall**

TYPES OF SAMPLING

- **Statistical Sampling**
  - Method based on the assumption that, within a given confidence level a **RANDOMLY** selected sample of items from a population will reflect the same characteristics that occur in the population.
  - **Random sampling** is the purest form of statistical, also called probability sampling. Each member of the population has an equal and known chance of being selected.
    - BE CAREFUL HOW YOUR DEFINE RANDOM! It is NOT just going around and saying, “Oh, I’ll take that one, and that one – and one over there, etc., etc., etc.

TYPES OF SAMPLING

- **Judgment Sampling**
  - **is a common nonprobability method. The researcher selects the sample based on judgment, his or her PROFESSIONAL judgment.**
  - **But be careful as your results may not be GENERALIZABLE!**

TYPES OF SAMPLING

- **Purposeful/Purposive Sampling**
  - Employed when random sampling is not appropriate, feasible, or desirable (in practical and/or conceptual terms):
    - Known or Reported **SYSTEMIC** Defects
    - Known or Reported **SIGNIFICANT** defects
- **NOTE – Purposive sampling is NOT your BASELINE method to be used in performing a PMSA! Why?**
  - Because it is used only when you have CREDIBLE REPORTS of a SYSTEMIC or SIGNIFICANT PROBLEM – and can then "snowball" to determine similar occurrences versus an isolated occurrence.

HOW MANY SAMPLE ITEMS DO I SELECT?

- **Technical Answer!**
- **It depends!**
  - **Generally TWO CRITICAL DRIVERS:**
    - **POPULATION SIZE**
      - **Either Known or Estimated**
    - **CONFIDENCE LEVEL**
      - **Based upon criticality/sensitivity**
- **"OLD" Appendix B of the DoD Prop Man provided a table with the sample sizes for various population sizes and a 90% Confidence Level.**
- **There are other tables out there that provide the same information at higher Confidence Level, .e., 95% and 97%.**

HOW MANY SAMPLE ITEMS DO I SELECT?

- **One source available for determining sample size…**
  - **http://www.raosoft.com/samplesize.html**
    - **ATTENTION: Careful, as with this program they use a single sampling process. In DOD we use a DOUBLE SAMPLING plan – and as such if you use RAOSOFT – you would need to halve the suggested number!**
    - **I would recommend that you use the Tables that follow this chart.**

APPENDIX B
DOUBLE SAMPLING PLAN

(90% confidence of rejecting lots having 10% or more defectives)

Lot Range	Sample Size 1	Accept if Defects in Sample 1 Are	Reject if Defects in Sample 1 Are	Continue with Sample 2 if Defects in Sample 1 Are	Sample Size 2	Accept if sum of Defects in Samples 1 and 2 Equals or is Less Than	Reject if Sum of Defects in Samples 1 and 2 Equals or Exceeds
1-18	All	0	1	-	-	-	-
19-50	18	0	1	-	-	-	-
51-90	21	0	2	1	21	1	2
91-150	25	0	3	1 or 2	25	2	3
151-400	32	0	4	1,2 or 3	32	3	4
401-10,000	34	0	4	1,2 or 3	34	3	4
10,001-35,000	40	0	5	1,2,3 or 4	40	4	5
35,001-100,000	46	0	6	1,2,3,4, or 5	46	5	6
100,000 +	52	0	7	1,2,3,4,5, or 6	52	6	7

Obtained from DLA Research Report DLA –XX-P20258 August 1992

APPENDIX B 2
95% CONFIDENCE DOUBLE SAMPLING PLAN

(95% confidence of rejecting lots having 10% or more defects)

Lot Range	Sample Size 1	Accept if Defects in Sample 1 Are	Reject if Defects in Sample 1 Are	Continue with Sample 2 if Defects in Sample 1 Are	Sample Size 2	Accept if sum of Defects in Samples 1 and 2 Equals or is Less Than	Reject if Sum of Defects in Samples 1 and 2 Equals or Exceeds
1-22	All	0	1	-	-	-	-
23-50	22	0	1	-	-	-	-
51-90	25	0	2	1	25	1	2
91-150	30	0	3	1 or 2	30	2	3
151-400	37	0	4	1,2 or 3	37	3	4
401-10,000	39	0	4	1,2 or 3	39	3	4
10,001-35,000	45	0	5	1,2,3 or 4	45	4	5
35,001-100,000	52	0	6	1,2,3,4, or 5	52	5	6
100,000 +	58	0	7	1,2,3,4,5, or 6	58	6	7

Obtained from DLA Research Report DLA –XX-P20258 August 1992

APPENDIX B 3
97% CONFIDENCE DOUBLE SAMPLING PLAN

(97% confidence of rejecting lots having 10% or more defects)

Lot Range	Sample Size 1	Accept if Defects in Sample 1 Are	Reject if Defects in Sample 1 Are	Continue with Sample 2 if Defects in Sample 1 Are	Sample Size 2	Accept if sum of Defects in Samples 1 and 2 Equals or is Less Than	Reject if Sum of Defects in Samples 1 and 2 Equals or Exceeds
1-25	All	0	1	-	-	-	-
26-50	25	0	1	-	-	-	-
51-90	28	0	2	1	28	1	2
91-150	33	0	3	1 or 2	33	2	3
151-400	41	0	4	1,2 or 3	41	3	4
401-10,000	43	0	4	1,2 or 3	43	3	4
10,001-35,000	50	0	5	1,2,3 or 4	50	4	5
35,000-100,000	56	0	6	1,2,3,4, or 5	56	5	6
100,00 +	63	0	7	1,2,3,4,5, or 6	63	6	7

Obtained from DLA Research Report DLA –XX-P20258 August 1992

HOW MANY SAMPLE ITEMS DO I SELECT?

- **FOR A JUDGMENT SAMPLE… How many sample items do I select?**
  - **As many or as few as YOU, in your professional judgment, deem necessary to reach a valid and supportable conclusion as to the "adequacy" of the process that you are auditing!**
- **FOR a PURPOSEFUL SAMPLE … How many sample items do I select?**
  - **You DON'T select samples**

HOW MANY SAMPLE ITEMS DO I SELECT?

- **FOR a PURPOSEFUL SAMPLE … How many sample items do I select?**
  - **You DON'T select samples!!!**
  - **Rather, this technique is used when:**
    - **There are REPORTED SYSTEMIC ERRORS**
      - **Some one told you that "X" was happening**
      - **But be careful about "Stories, out of class" i.e., that someone wants to "get even" with the company.**
    - **Through other actions (Outside of your audit) you have disclosed a SIGNIFICANT WEAKNESS!**
- **REMEMBER!!! Your PRIMARY METHODOLOGY should be STATISTICAL RANDOM SAMPLING!**

RANDOM SAMPLING

- **“A Random Sample is one in which every possible combination of items in the population has an equal chance of constituting the sample. The only way an auditor can be confident a random sample has been obtained is by adopting a formal methodology that is designed to do this.”**
  - **Auditing – An Integrated Approach, Arens and Loebbecke, Prentice Hall**

HOW DO I SELECT THE RANDOM NUMBERS?

- **Multiple ways:**
  - **Just pick a bunch of numbers any numbers will do … NO! NO! NO!!!**
    - **That is NOT RANDOM!!!**
- **TECHNICALLY CORRECT WAYS:**
  - **Use any variety of Stat Sampling Tables – found in most Statistics Books.**
  - **Use the Random Number Tables**
    - **In the "OLD" DOD PROPERTY MANUAL or**
    - **From NIST - http://ts.nist.gov/WeightsAndMeasures/upload/AppenB-HB133-05-Z.pdf**
  - **Or, like most of us, use http://randomizer.org/form.htm or http://stattrek.com/Tables/Random.aspx**
    - **ATTENTION – to use these websites you must ALREADY KNOW YOUR SAMPLE SIZE!!! Which you can obtain from the Tables provided earlier or through the RAOSOFT site.**
  - **Even MS-EXCEL has a program to do this.**

NEXT STEP!

- **O.k., I defined my population!**
- **I selected my RANDOM Sample, using RANDOM numbers!**
- **I performed my collection of data (MY audit Evidence) for each of the respective processes testing the sample items!**
- **How do I determine whether that process is “adequate” or “inadequate?”**

EVALUATION OF A SAMPLE

How do I evaluate the sample/sample items?

- **Yes, the "Old" DOD Property Manual provided some "concrete" numbers to use in determining "Adequacy."**
- **My opinion – those numbers have been misused by many PAs. Taking them as absolutes and not reading OTHER portions of the manual that provided deeper analysis.**

EVALUATION OF A SAMPLE

- OLD GUIDANCE UPDATED and PARAPHRASED
  - If **NO** defects are found in the first sample, the process segment **SHALL** be evaluated as **ADEQUATE**.
  - If the number of item defects found in the first sample is equal to the number of defects found in column 4 of Appendix 2, where the defects are **NOT** of a **SYSTEMIC NATURE** the process segment **MAY** be evaluated as **ADEQUATE**.
  - If the number of item defects found in the first sample is equal to the number of defects found in column 4 of Appendix 2, where the defects **ARE OF A SYSTEMIC NATURE**, the process segment **SHALL** be evaluated as **INADEQUATE**.

EVALUATION OF A SAMPLE

- And it continues with the other scenarios applicable under a DOUBLE SAMPLING PLAN!
  - If the number of item defects found in the first sample is equal to the number of defects found in column 5 of Appendix 2, the PA shall use the second sample selected in paragraph C4.2.4.3., above. If the total number of defects found in both sample 1 and sample 2 equals or is less than the number specified in column 7 of Appendix 2, the functional segment shall be evaluated as satisfactory.
  - If the total number of defects found in both sample 1 and sample 2 equals or is more than the number specified in column 8 of Appendix 2 where the defects are not of a systemic nature, the functional segment may be evaluated as satisfactory.
  - If the total number of defects found in both sample 1 and sample 2 equals or is more than the number specified in column 8 of Appendix 2 where the defects are of a systemic nature, the functional segment shall be evaluated as Unsatisfactory.

EVALUATION OF A SAMPLE

- The Point I am trying to drive home…
- IT IS NOT JUST A **QUANTITATIVE EVALUATION** OF THE SAMPLE AND ITS DEFECTS!!!
- YOU MUST ALSO PERFORM A **QUALITATIVE EVALUATION** OF THE SAMPLE!!!
- TWO CONCEPTS THAT YOU MUST UNDERSTAND:

SIGNIFICANCE **MATERIALITY**

EVALUATION OF A SAMPLE

- Generally Accepted GOVERNMENT Auditing STANDARDS – GAGAS – The Yellow Book
  - 7.04 – **Significance** in a Performance Audit
    - The concept of significance assists auditors throughout a performance audit, including when ***deciding the type and extent of audit work to perform, when evaluating the results of audit work….***"
      - With a footnote…
      - In the performance audit standards, the term significant is comparable to the term "**material**" as used in the context of financial statement audits.

EVALUATION OF A SAMPLE

- Some Examples:
  - In performing a PMSA under the process of records you find that there were four sample items from 34 where the physical count differed from the record count.
    - In Sample item #3 – the difference was plus 6 items.
    - In Sample item #7 – the difference was plus 1 item.
    - In Sample item #9 – the difference was short 9 items.
    - In Sample item #2 – the difference was short 20 items.
- Would you rate this process:
  - ADEQUATE or INADEQUATE – and WHY?
    - Rhetorical Question – Don't answer – see next slide!

EVALUATION OF A SAMPLE

- You really can't answer the question!
- I have not provided you sufficient information to answer that question.
- The real Answer…

IT DEPENDS!

EVALUATION OF A SAMPLE

- Yes, you need to look at this **QUANTITATIVELY**.
  - And if that was the ONLY evaluative criteria – then the process would be rated – INADEQUATE!

- But, you ALSO need to review it **QUALITATIVELY**!
  - Let's provide you some more data regarding those items ….

EVALUATION OF A SAMPLE

- In Sample item #3 – the difference was plus 6 items.
  - Total dollar value… 6 Cents (WASHERS – Common Hardware)
- In Sample item #7 – the difference was plus 1 item.
  - Total dollar value… $1.50 (BOLTS – Common Hardware)
- In Sample item #3 – the difference was short 9 items.
  - Total dollar value… $7.11 Cents (Non-sensitive Circuit Boards)
- In Sample item #7 – the difference was short 20 items.
  - Total dollar value… $62.40 (Tubes of Non-toxic glue)
- TOTAL VALUE OF GOVERNMENT MATERIAL INVENTORY
  - $2.9 Million
- **QUANTITATIVELY and QUALITATIVELY**
  - THERE IS NO **SIGNIFICANCE**
  - THERE IS NO **MATERIALITY**

EVALUATION OF A SAMPLE

- In Sample item #3 – the difference was plus 6 items.
  - Total dollar value… 6 Cents -- 6 Vials tetrodotoxin (fugu pufferfish)
- In Sample item #7 – the difference was plus 1 item.
  - Total dollar value… $1.50 -- 1 vial tetanus used for medical research
- In Sample item #3 – the difference was short 9 items.
  - Total dollar value… $7.11 Cents
    - 9 samples of Polonium used for nuclear research
- In Sample item #7 – the difference was short 20 items.
  - Total dollar value… $62.40 -- 20 -- .50 BMG Rounds (Armor Piercing Incendiary)
- TOTAL VALUE OF GOVERNMENT MATERIAL INVENTORY
  - $2.9 Million

QUALITATIVELY

THERE **IS SIGNIFICANCE**

THERE **IS MATERIALITY**

EVALUATION OF A SAMPLE

- So, what do you need to review when evaluating a SAMPLE?
  - A **QUANTITATIVE** ANALYSIS
    - Look at the NUMBERS
      - Dollar Value
      - Quantities
  - A **QUALITATIVE** ANALYSIS
    - Look at the IMPACT, i.e., Significance/Materiality
      - To the Property Management System
        - » Single Process as well as en toto!
      - To the ability to perform
      - To Public Health, Safety and Welfare

SUMMARY

- We have tried to walk you through a number of different concepts associated with the performance of a PMSA including
  - Populations and Population Definition
  - Sampling and
  - The Evaluation of a Sample

RECOMMENDATIONS

- **READ** all that you can on auditing!!!
  - EVERY PA should have as part of his or her library the following FREE Government Resources:
    - GAO Yellow Book, GAGAS
      - http://www.gao.gov/govaud/ybk01.htm
      - Note – there is an exposure draft of the 2010 version (not final)
    - DCAA Manual, 7640.1
      - http://www.dcaa.mil/cam.htm
    - Defense Contract Property Control System Analysis Primer
      - https://acc.dau.mil/CommunityBrowser.aspx?id=18003&lang=en-US

RECOMMENDATIONS

- **READ all that you can on auditing!!!**
  - **EVERY PA should INVEST in BOOKS related to this field as part of their PROFESSIONAL LIBRARY!**
    - **Generally Accepted Auditing Standards**
      - **New revisions come out every few years**
    - **Statistics for Business Executives**
    - **Sampling**
    - **Internal Auditing**
    - **Operational Auditing**
- **Lastly, SEARCH THE WEB!!! There are RICH RESOURCES out there – you just need to look for them!**

THANK YOU!

Dr. Douglas N. Goetz, CPPM, CF

OLD DAU PROFESSOR

Recently Retired – now Rehired.

President of the newly incorporated GP Consultants.

Hopefully a Good NPMA Instructor.

Chief cook and bottle washer at Home, responsible for all “honeydue” requirements – though my wife HAS told me to stay out of HER house!

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NOTE: Since I gave up my DAU office I no longer have a DAU phone #!